

CLAIMS

We claim:

1. A device for mixing diluted fuel in a fuel cell; said device comprising:
a fuel mixing chamber;
a undiluted fuel inlet line for delivering substantially undiluted fuel into said mixing chamber;
a bubbling line for bubbling a gas into said mixing chamber, wherein said bubbling line comprises a return air/water line from at least one of an anode and a cathode of said fuel cell; and
a diluted fuel outlet line for transporting diluted fuel to an external fuel cell stack.
2. The device of claim 1, wherein said undiluted fuel comprises substantially pure MeOH.
3. The device of claim 2, wherein said diluted fuel comprises at least partially diluted aqueous MeOH.
4. The device of claim 1, further comprising a sensor for determining fuel concentration is said mixing chamber.
5. The device of claim 4, wherein said sensor is responsive to MeOH concentration.

6. The device of claim 1, further comprising a gas permeable membrane.

- 7.** A method for mixing diluted fuel in a fuel cell device; said method comprising the steps of:
- providing a fuel mixing chamber;
 - providing a undiluted fuel inlet line for delivering substantially undiluted fuel into said mixing chamber;
 - providing a bubbling line for bubbling a gas into said mixing chamber, wherein said bubbling line comprises a return air/water line from at least one of an anode and a cathode of said fuel cell; and
 - providing a diluted fuel outlet line for transporting diluted fuel to an external fuel cell stack.
- 8.** The method of claim **7**, wherein said undiluted fuel comprises substantially pure MeOH.
- 9.** The method of claim **8**, wherein said diluted fuel comprises at least partially diluted aqueous MeOH.
- 10.** The method of claim **7**, further comprising the step of providing a sensor for determining fuel concentration in said mixing chamber.
- 11.** The method of claim **10**, wherein said sensor is responsive to MeOH concentration.

12. The method of claim 7, further comprising the step of providing a gas permeable membrane.
13. The method of claim 7, further comprising the step of turbulently mixing said diluted fuel by bubbling gas into said mixing chamber.
14. The method of claim 7, further comprising the step of actuating delivery of undiluted fuel to said mixing chamber.
15. The method of claim 7, further comprising the step of terminating delivery of undiluted fuel to said mixing chamber.

16. A device for mixing diluted MeOH fuel in a DMFC; said device comprising:

a fuel mixing chamber;

a undiluted MeOH inlet line for delivering substantially undiluted MeOH into said mixing chamber;

a bubbling line for bubbling air into said mixing chamber, wherein said bubbling line comprises a return air/water line from at least one of an anode and a cathode of said DMFC;

a diluted MeOH outlet line for transporting diluted fuel to an external fuel cell stack; and

a sensor for determining MeOH concentration in said mixing chamber

17. The device of claim **16**, further comprising a gas permeable membrane.